

Bellwork: 3/20/13

Simplify the following rational expression:

$$\begin{aligned} 1) \frac{9-x^2}{2x^2-7x+3} &= \frac{-x^2+9}{2x^2-7x+3} = \frac{-(x^2-9)}{2x^2-7x+3} = \frac{-(x+3)(x-3)}{(2x-1)(x-3)} \\ &= \frac{-(x+3)}{(2x-1)} \end{aligned}$$

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$$\begin{aligned} \textcircled{4} \frac{8x-4}{1-4x^2} &= \frac{4(2x-1)}{-4x^2+1} = \frac{4(2x-1)}{-(4x^2-1)} = \frac{4(2x-1)}{-(2x+1)(2x-1)} \\ &= \frac{4}{-(2x+1)} \end{aligned}$$

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$$\textcircled{7} \quad \frac{5x^2 + 10xy}{15xy + 30y^2} = \frac{5x\cancel{(x+2y)}}{15y\cancel{(x+2y)}} = \frac{5x}{15y}$$

$$= \frac{1x}{3y}$$

or $\frac{x}{3y}$

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$$\textcircled{8} \quad \frac{a^2 - b^2}{b - a} = \frac{(a+b)(a-b)}{b-a} = \frac{(a+b)(a-b)}{-a+b}$$

$$= \frac{(a+b)(a-b)}{-(a-b)}$$

$x^2 - y^2$
 $x^2 - 9$

$$\frac{(a+b)\cancel{(a-b)}}{-(a-b)} = \frac{(a+b)}{-1} \text{ or } -1(a+b) \text{ or } -(a+b)$$

$$= -a - b$$

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II. Multiplying Rational Expressions:

Both rational numbers and rational expressions are multiplied in the same way:

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd} \quad \text{where } b \text{ and } d \neq 0$$

Always express answers in simplest form.

Example 1: $\frac{1}{1} \cdot \frac{3}{4} = \frac{3}{4}$ $\frac{60ac}{80ac} = \frac{3}{4}$

Example 2: $\frac{x^2}{3} \cdot \frac{(x+2)(x-3)}{2} = \frac{x^2(x+2)}{2}$

Sometimes you will need to factor before you multiply in order to find the common factors so you can reduce the expression.

Example 3: $\frac{x^2-9}{x^2+x-12} \cdot \frac{x+2}{x+3} = \frac{(x+3)(x-3)}{(x+4)(x-3)} \cdot \frac{(x+2)}{(x+3)} = \frac{(x+2)}{(x+4)}$

Example 4: $\frac{x^3+5x^2}{(x+5)^2} \cdot \frac{x^2-25}{x^2} = \frac{x^2(x+5)}{(x+5)(x+5)} \cdot \frac{(x+5)(x-5)}{x^2} = \frac{x-5}{1} = \boxed{x-5}$

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Homework: page 4 in packet

① $\frac{5x+15}{4x+8} \cdot \frac{2x+4}{25} = \frac{5(x+3)}{4(x+2)} \cdot \frac{2(x+2)}{25}$

$\frac{10(x+3)}{100} = \frac{1(x+3)}{10} = \frac{(x+3)}{10}$

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